



# PERRY JOHNSON LABORATORY ACCREDITATION, INC.

## Certificate of Accreditation

*Perry Johnson Laboratory Accreditation, Inc. has assessed the Laboratory of:*

### ***HQ - Corporación BH, S.C.***

***Sierra del Fraile # 117, Col. Arroyo Seco, Monterrey, Nuevo León, C.P. 64740***

### ***Site - Etalons S.A. de C.V.***

***Blvd. Miguel Ramos Arizpe # 157-3, Ramos Arizpe, Coahuila, México, C.P. 25900***

*(Hereinafter called the Organization) and hereby declares that Organization is accredited in accordance with the recognized International Standard:*

### **ISO/IEC 17025:2005**

This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (as outlined by the joint ISO-ILAC-IAF Communiqué dated January 2009):

***Dimensional, Electrical, Mechanical, Chemical, Mass, Force and Weighing Devices, Thermodynamic and Time & Frequency Calibration***  
*(As detailed in the supplement)*

Accreditation claims for such testing and/or calibration services shall only be made from addresses referenced within this certificate. This Accreditation is granted subject to the system rules governing the Accreditation referred to above, and the Organization hereby covenants with the Accreditation body's duty to observe and comply with the said rules.

For PJLA:

*Initial Accreditation Date:*

*Issue Date:*

*Expiration Date:*

August 14, 2012

August 30, 2016

October 31, 2018

*Accreditation No.:*

*Certificate No.:*

73706

L16-352

Tracy Szerszen  
President/Operations Manager

Perry Johnson Laboratory  
Accreditation, Inc. (PJLA)  
755 W. Big Beaver, Suite 1325  
Troy, Michigan 48084

*The validity of this certificate is maintained through ongoing assessments based on a continuous accreditation cycle. The validity of this certificate should be confirmed through the PJLA website: [www.pjlab.com](http://www.pjlab.com)*



# Certificate of Accreditation: Supplement

## Site - Etalons, S.A de C.V

Blvd. Miguel Ramos Arizpe # 157-3, Ramos Arizpe,  
Coahuila, México, C.P. 25900  
Contact Name: Roberto Benitez Phone: 818-398-2950

Accreditation is granted to the facility to perform the following calibrations:

### Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Micrometers <sup>FO</sup>	0.05 in to 24 in	(52 + 16L) $\mu$ in	Grade 1 Gage Blocks
Calipers <sup>FO</sup>	0.05 in to 24 in	(392 + 16L) $\mu$ in	Grade 1 Gage Blocks
Indicators <sup>FO</sup>	0.005 in to 2 in	(384 + 16L) $\mu$ in	Micrometer head Cal
Height Gages <sup>FO</sup>	0.05 in to 24 in	(392 + 16L) $\mu$ in	Grade 1 Gage Blocks
Rules and Tapes <sup>FO</sup>	2 mm to 1 000 mm	(570 + 0.24L) $\mu$ m	Magnifier and Linear Scales
Thread Plug Gage 3 Pitch Diameter <sup>FO</sup>	0-80 to 1-12	210 $\mu$ in	Three Wire Method and Digital Micrometer

### Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Output DC Voltage <sup>FO</sup>	9 $\mu$ V to 330 mV	81 $\mu$ V/V + 3 $\mu$ V	Fluke 5500A
	330 mV to 3 V	62 $\mu$ V/V + 5 $\mu$ V	
	3 V to 30 V	62 $\mu$ V/V + 50 $\mu$ V	
	30 V to 1 000 V	67 $\mu$ V/V + 1.5 mV	
		30 mV to 1 000 V	0.1 % of Output + 10 mV
	1 kV to 30 kV	0.6 % of Output + 30 V	ESH Electrostatic Voltmeter
Equipment to Output DC Current <sup>FO</sup>	0.33 A to 11 A	0.097 % of Output + 160 $\mu$ A	Fluke 5500 A and 50 Turn Coil
Clamp-On Meters <sup>FO</sup>	3.3 mA to 550 A	0.35 % of Output + 0.018A	
Equipment to Measure DC Power <sup>FO</sup>	0.1 mW to 11.22 kW	0.14 % of Output + 0.45 $\mu$ W	Fluke 5500 A
Equipment to Measure Resistance <sup>FO</sup>	0.25 $\Omega$ to 10.99 $\Omega$	0.013 % of Output + 0.008 $\Omega$	Fluke 5500 A
	11 $\Omega$ to 329.999 $\Omega$	0.01 % of Output + 0.015 $\Omega$	
	330 $\Omega$ to 3.299 99 k $\Omega$	0.01 % of Output + 0.06 $\Omega$	
	3.3 k $\Omega$ to 32.999 9 k $\Omega$	0.01 % of Output + 0.6 $\Omega$	
	33 k $\Omega$ to 329.999 k $\Omega$	0.013 % of Output + 6 $\Omega$	
	330 k $\Omega$ to 3.299 99 M $\Omega$	0.017 % of Output + 55 $\Omega$	
	3.3 M $\Omega$ to 32.999 9 M $\Omega$	0.11 % of Output + 550 $\Omega$	
	33 M $\Omega$ to 109.999 M $\Omega$	0.57 % of Output + 5.5 k $\Omega$	
	110 M $\Omega$ to 330 M $\Omega$	0.57 % of Output + 17 k $\Omega$	
	1 $\Omega$ to 1.111 110 M $\Omega$	0.01 % of Output + 2 m $\Omega$	GENRAD 1433B IET VRS-100-101K-BP
1 k $\Omega$ to 1 T $\Omega$	2 % of Output		



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### Electrical

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Equipment to Measure Capacitance @ 1 kHz <sup>FO</sup>	0.33 nF to 0.499 9 nF	0.62 % of Output + 16 pF	Fluke 5500A
	0.5 nF to 1.099 9 nF	0.6 % of Output + 12 pF	
	1.1 nF to 3.299 9 nF	0.58 % of Output + 12 pF	
	3.3 nF to 10.999 nF	0.49 % of Output + 25 pF	
	11 nF to 32.999 nF	0.29 % of Output + 120 pF	
	33 nF to 109.99 nF	0.29 % of Output + 120 pF	
	110 nF to 329.99 nF	0.33 % of Output + 300 pF	
	0.33 nF to 1.099 9 $\mu$ F	0.28 % of Output + 1.6 nF	
	(1.1 $\mu$ F to 3.299 9 $\mu$ F	0.42 % of Output + 3.5 nF	
	3.3 $\mu$ F to 10.999 $\mu$ F	0.42 % of Output + 12 nF	
	11 $\mu$ F to 32.999 $\mu$ F	0.5 % of Output + 32 nF	
	33 $\mu$ F to 109.99 $\mu$ F	0.63 % of Output + 0.13 $\mu$ F	
	110 $\mu$ F to 329.99 $\mu$ F	0.82 % of Output + 0.04 $\mu$ F	
	330 $\mu$ F to 1.1 mF	1.3 % of Output + 0.16 $\mu$ F	
1 pF to 1.1 $\mu$ F	0.5 % of Output + 5 pF	GenRad 1412BC	
Equipment to Measure Capacitance to Fixed Points <sup>FO</sup>	0.001 $\mu$ F	0.5 % of Output	GenRad 1409F
	1 $\mu$ F	0.06 % of Output	GenRad 1409Y
Equipment to Measure Inductance Fixed Point @ 1kHz <sup>FO</sup>	200 $\mu$ H	0.29 % of Output	GenRad 1482C
	2 mH	0.12 % of Output	GenRad 1482F
	2 H	0.12 % of Output	GenRad 1482Q
Equipment to Measure AC Voltage At the Listed frequency <sup>FO</sup>			Fluke 5500A
10 Hz to 45 Hz	33 mV to 329.999 mV	960 $\mu$ V	
45 Hz to 10 kHz	33 mV to 329.999 mV	260 $\mu$ V	
10 kHz to 20 kHz	33 mV to 329.999 mV	350 $\mu$ V	
20 kHz to 50 kHz	33 mV to 329.999 mV	680 $\mu$ V	
50 kHz to 100 kHz	33 mV to 329.999 mV	1 100 $\mu$ V	
100 kHz to 500 kHz	33 mV to 329.999 mV	2 700 $\mu$ V	
Equipment to Measure AC Voltage At the Listed frequency <sup>FO</sup>			
10 Hz to 45 Hz	0.33 V to 3.299 99 V	10 mV	
45 Hz to 10 kHz	0.33 V to 3.299 99 V	19 mV	
10 kHz to 20 kHz	0.33 V to 3.299 99 V	3 mV	



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### Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure AC Voltage At the Listed frequency <sup>FO</sup>			Fluke 5500A
20 kHz to 50 kHz	0.33 V to 3.299 99 V	10 mV	
50 kHz to 100 kHz	0.33 V to 3.299 99 V	10 mV	
100 kHz to 500 kHz	0.33 V to 3.299 99 V	23 mV	
Equipment to Measure AC Voltage At the Listed frequency <sup>FO</sup>			
10 Hz to 45 Hz	3.3 V to 32.999 9 V	60 mV	
45 Hz to 10 kHz	3.3 V to 32.999 9 V	20 mV	
10 kHz to 20 kHz	3.3 V to 32.999 9 V	30 mV	
20 kHz to 50 kHz	3.3 V to 32.999 9 V	80 mV	
50 kHz to 100 kHz	3.3 V to 32.999 9 V	190 mV	
Equipment to Measure AC Voltage At the Listed frequency <sup>FO</sup>			
45 Hz to 1 kHz	33 V to 329.999 V	580 mV	
1 kHz to 10 kHz	33 V to 329.999 V	300 mV	
10 kHz to 20 kHz	33 V to 329.999 V	2 300 mV	
45 Hz to 1 kHz	330 V to 1 000 V	2 200 mV	
1 kHz to 10 kHz	330 V to 1 000 V	2 600 mV	
Equipment to Measure AC Voltage At the Listed frequency <sup>FO</sup>			Fluke 45
45 Hz to 20 kHz	675 mV to 750 V	0.07 % of reading + 225 mV	
45 Hz to 10 kHz	0.75 kV to 30 kV	0.7 % of reading + 30 V	ESH Electrostatic Voltmeter
Equipment to Output AC Current At the Listed frequency <sup>FO</sup>			Fluke 5500A and 50 Tum Coil
10 Hz to 10 kHz	0.029 mA to 0.329 9 mA	0.14 % of reading + 0.25 $\mu$ A	
10 Hz to 10 kHz	33 mA to 329.99 mA	0.1 % of reading + 30 $\mu$ A	
10 Hz to 5 kHz	0.33 A to 2.199 99 A	0.16 % of reading + 300 $\mu$ A	
10 Hz to 3 kHz	2.2 A to 11 A	0.1 % of reading + 2 $\mu$ A	
Clamp-On Meters <sup>FO</sup> 46 Hz to 65 Hz	10 A to 550 A	0.37 % of reading + 0.04 $\mu$ A	



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AC Power Generate –Up to 1000V @ 60Hz <sup>FO</sup>	0.1 mW to 11.22 kW	0.18 % of Output + 0.16 mW	Fluke 5500 A PF=1
Electrical Calibration of RTD Indicators PT 385, 100 $\Omega$ <sup>FO</sup>	-200 °C to -80 °C	0.19 °C	Electric Simulation of RTD Output Fluke 5500A and Fluke 741B
	-80 °C to 0 °C	0.19 °C	
	0 °C to 100 °C	0.2 °C	
	100 °C to 300 °C	0.21 °C	
	300 °C to 400 °C	0.31 °C	
	400 °C to 630 °C	0.45 °C	
	630 °C to 800 °C	0.32 °C	
Electrical Calibration of RTD Indicators PT 3916, 100 $\Omega$ <sup>FO</sup>	-200 °C to -80 °C	0.34 °C	Electric Simulation of RTD Output Fluke 5500A and Fluke 741B
	-80 °C to 0 °C	0.21 °C	
	0 °C to 100 °C	0.19 °C	
	100 °C to 300 °C	0.15 °C	
	300 °C to 400 °C	0.21 °C	
	400 °C to 630 °C	0.29 °C	
Electrical Calibration of RTD Indicators PT 3926, 100 $\Omega$ <sup>FO</sup>	-200 °C to -80 °C	0.21 °C	Electric Simulation of RTD Output Fluke 5500A and Fluke 741B
	-80 °C to 0 °C	0.19 °C	
	0 °C to 100 °C	0.15 °C	
	100 °C to 300 °C	0.16 °C	
	300 °C to 400 °C	0.17 °C	
	400 °C to 630 °C	0.23 °C	
Electrical Calibration of RTD Indicators PT 385, 200 $\Omega$ <sup>FO</sup>	-200 °C to -80 °C	0.18 °C	Electric Simulation of RTD Output Fluke 5500A and Fluke 741B
	-80 °C to 0 °C	0.13 °C	
	0 °C to 100 °C	0.18 °C	
	100 °C to 260 °C	0.21 °C	
	260 °C to 300 °C	0.19 °C	
	300 °C to 400 °C	0.32 °C	
	400 °C to 600 °C	0.26 °C	
	600 °C to 630 °C	0.22 °C	
Electrical Calibration of RTD Indicators PT 385, 500 $\Omega$ <sup>FO</sup>	-200 °C to -80 °C	0.29 °C	Electric Simulation of RTD Output Fluke 5500A and Fluke 741B
	-80 °C to 0 °C	0.21 °C	
	0 °C to 100 °C	0.19 °C	
	100 °C to 260 °C	0.14 °C	



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Electrical Calibration of RTD Indicators PT 385, 500 $\Omega^{FO}$	300 °C to 400 °C	0.15 °C	Electric Simulation of RTD Output Fluke 5500A and Fluke 741B
	400 °C to 600 °C	0.31 °C	
	600 °C to 630 °C	0.22 °C	
	260 °C to 300 °C	0.15 °C	
Electrical Calibration of RTD Indicators PT 385, 1 000 $\Omega^{FO}$	-200 °C to -80 °C	0.2 °C	
	-80 °C to 0 °C	0.13 °C	
	0 °C to 100 °C	0.13 °C	
	100 °C to 260 °C	0.19 °C	
	260 °C to 300 °C	0.14 °C	
	300 °C to 400 °C	0.15 °C	
	400 °C to 600 °C	0.15 °C	
	600 °C to 630 °C	0.32 °C	
Electrical Calibration of Thermocouple Indicators Type E <sup>FO</sup>	-250 °C to -100 °C	0.58 °C	Fluke 5500A and Fluke 741B
	-100 °C to -25 °C	0.19 °C	
	-25 °C to 350 °C	0.17 °C	
	350 °C to 650 °C	0.19 °C	
Electrical Calibration of Thermocouple Indicators Type J <sup>FO</sup>	650 °C to 1 000 °C	0.26 °C	
	-210 °C to -100 °C	0.32 °C	
	-100 °C to -30 °C	0.19 °C	
	-30 °C to 150 °C	0.17 °C	
	150 °C to 760 °C	0.19 °C	
Electrical Calibration of Thermocouple Indicators Type K <sup>FO</sup>	760 °C to 1 200 °C	0.28 °C	
	-200 °C to -100 °C	0.39 °C	
	-100 °C to -25 °C	0.22 °C	
	-25 °C to 120 °C	0.19 °C	
	120 °C to 1 000 °C	0.31 °C	
Electrical Calibration of Thermocouple Indicators Type R <sup>FO</sup>	1 000 °C to 1 372 °C	0.47 °C	
	0 °C to 250 °C	0.66 °C	
	250 °C to 400 °C	0.41 °C	
	400 °C to 1 000 °C	0.39 °C	
Electrical Calibration of Thermocouple Indicators Type S <sup>FO</sup>	1 000 °C to 1 767 °C	0.47 °C	
	0 °C to 250 °C	0.55 °C	
	250 °C to 400 °C	0.44 °C	
	400 °C to 1 000 °C	0.44 °C	
	1 000 °C to 1 767 °C	0.55 °C	



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### Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Electrical Calibration of Thermocouple Indicators Type T <sup>FO</sup>	-250 °C to -150 °C	0.76 °C	Electric Simulation of RTD Output Fluke 5500A and Fluke 741B
	-150 °C to 0 °C	0.29 °C	
	0 °C to 120 °C	0.2 °C	
	120 °C to 400 °C	0.18 °C	

### Mechanical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Torque Tester Analog/Digital <sup>FO</sup>	50 lbf·ft to 1 000 lbf·ft	0.25 % of reading	Torque Arms With Class M2 Weights Dead Weight 4" in and 8" Wheel
Torque Tools <sup>FO</sup>	25 lbf·in to 250 lbf·in	1 % of reading	Load Cell Mountz BMX-250i
	10 lbf·in to 100 lbf·in	1 % of reading	Load Cell Mountz BMX -100F
	100 lbf·in to 1 000 lbf·in	1 % of reading	Load Cell Mountz BMX-1000F
Pressure <sup>FO</sup>	3 psi to 300 psi	0.25 % of reading	Druck Pressure Calibrator
Vacuum <sup>FO</sup>	-11 psi to 0.5 psi	0.06 psi	Druck Pressure Calibrator

### Chemical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Ph3 Measure <sup>FO</sup>	4 pH	0.2 pH	Standard Solutions
	7 pH	0.2 pH	
	10 pH	0.2 pH	
Conductivity Measure Fixed Point <sup>FO</sup>	0.10 mS	1.6 $\mu$ S	
	1.44 mS	14 $\mu$ S	
	12.88 mS	130 $\mu$ S	
Volumetric Gas <sup>FO</sup>	2.5 cc/min to 250 cc/min	5.4 % of reading	TSI 4140



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### Mass, Force and Weighing Devices

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Analytical Balances <sup>FO</sup>	1 mg to 100 g	0.58 mg	Class 1 and Class F
	100 g to 20 kg	1.2 g	
	20 kg to 1 000 kg	0.12 kg	
Weights <sup>FO</sup>	5 kg	0.06 g	Weights Class F OIML R111
Force Gauge Tension <sup>FO</sup>	5 kgf to 250 kgf	0.7 kgf	Hanging Method Class M2 OIML
	4.59 lbf to 100 lbf	5.8 % of reading	Load Cell Strain Sense SST101UF
	100 lbf to 1 000 lbf	0.48 % of reading	Load Cell Strain Sense SST102UF
	1 000 lbf to 10 000 lbf	1.1 % of reading	Load Cell Strain Sense SST103UF
Force Gauge Compression <sup>FO</sup>	9.41 lbf to 100 lbf	5.8 % of reading	Load Cell Strain Sense SST101UF
	100 lbf to 1 000 lbf	0.55 % of reading	Load Cell Strain Sense SST102UF
	1 000 lbf to 10 000 lbf	1.1 % of reading	Load Cell Strain Sense SST103UF

### Thermodynamic

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Temperature Measuring Equipment <sup>FO</sup>	40 °C to 200 °C	0.31 °C	Micro Bath 6102
	-15 °C to 350 °C	0.68 °C	Hart Calibrator 9009
Infrared Temperature Measuring Equipment <sup>FO</sup>	50 °C to 450 °C	0.81 °C	Hart Calibrator 9132
Relative Humidity At 20 °C Dry Bulb <sup>FO</sup>	5 % RH to 95 % RH	1.6 % RH	Rotronic Hygro P2
Temperature Chamber <sup>O</sup>	-50 °C to 300 °C	0.65 °C	Data Logger Manufacturer Etalons Model: ETA- DAQ-01
Relative Humidity Chamber <sup>O</sup>	35 % to 95 %	1.2 % RH	Rotronic Hydropalm HP- 22A





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### Time & Frequency

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Frequency Equipment to Generate <sup>FO</sup>	0.01 Hz to 2 mHz	0.7 % of reading	Oscilloscope
Timers <sup>FO</sup>	3 600 <sub>s</sub>	0.6 s	Stopwatch

1. The CMC (Calibration and Measurement Capability) stated for calibrations included on this scope of accreditation represents the smallest measurement uncertainty attainable by the laboratory when performing a more or less routine calibration of a nearly ideal device under nearly ideal conditions. It is typically expressed at a confidence level of 95 % using a coverage factor  $k$  (usually equal to 2). The actual measurement uncertainty associated with a specific calibration performed by the laboratory will typically be larger than the CMC for the same calibration since capability and performance of the device being calibrated and the conditions related to the calibration may reasonably be expected to deviate from ideal to some degree.
2. The laboratories range of calibration capability for all disciplines for which they are accredited is the interval from the smallest calibrated standard to the largest calibrated standard used in performing the calibration. The low end of this range must be an attainable value for which the laboratory has or has access to the standard referenced. Verification of an indicated value of zero in the absence of a standard is common practice in the procedure for many calibrations but by its definition it does not constitute calibration of zero capacity.
3. The presence of a superscript FO means that the laboratory performs calibration of the indicated parameter both at its fixed location and onsite at customer locations. Example: Outside Micrometer<sup>FO</sup> would mean that the laboratory performs this calibration at its fixed location and onsite at customer locations.
4. Measurement uncertainties obtained for calibrations performed at customer sites can be expected to be larger than the measurement uncertainties obtained at the laboratories fixed location for similar calibrations. This is due to the effects of transportation of the standards and equipment and upon environmental conditions at the customer site which are typically not controlled as closely as at the laboratories fixed location.
5. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.